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(54) Cavity wall insulating block

(57) A block for insulating the cavity of a cavity wall comprises insulating material (3), e.g. a closed cell foamed plastics material within a skin (2) of a denser material, e.g. polyvinylchloride, the block having a hollow core with means for draining it, e.g. apertures (4) in an air baffle (3a). Stays (40) may be provided to strengthen the block.

The blocks may be formed integrally with the components, e.g. breeze blocks, of one or both leaves of the wall.

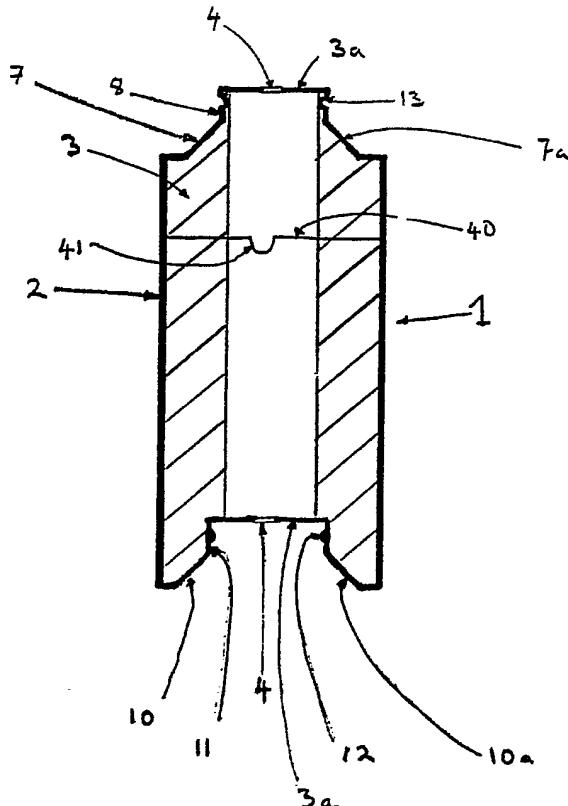


Fig 2

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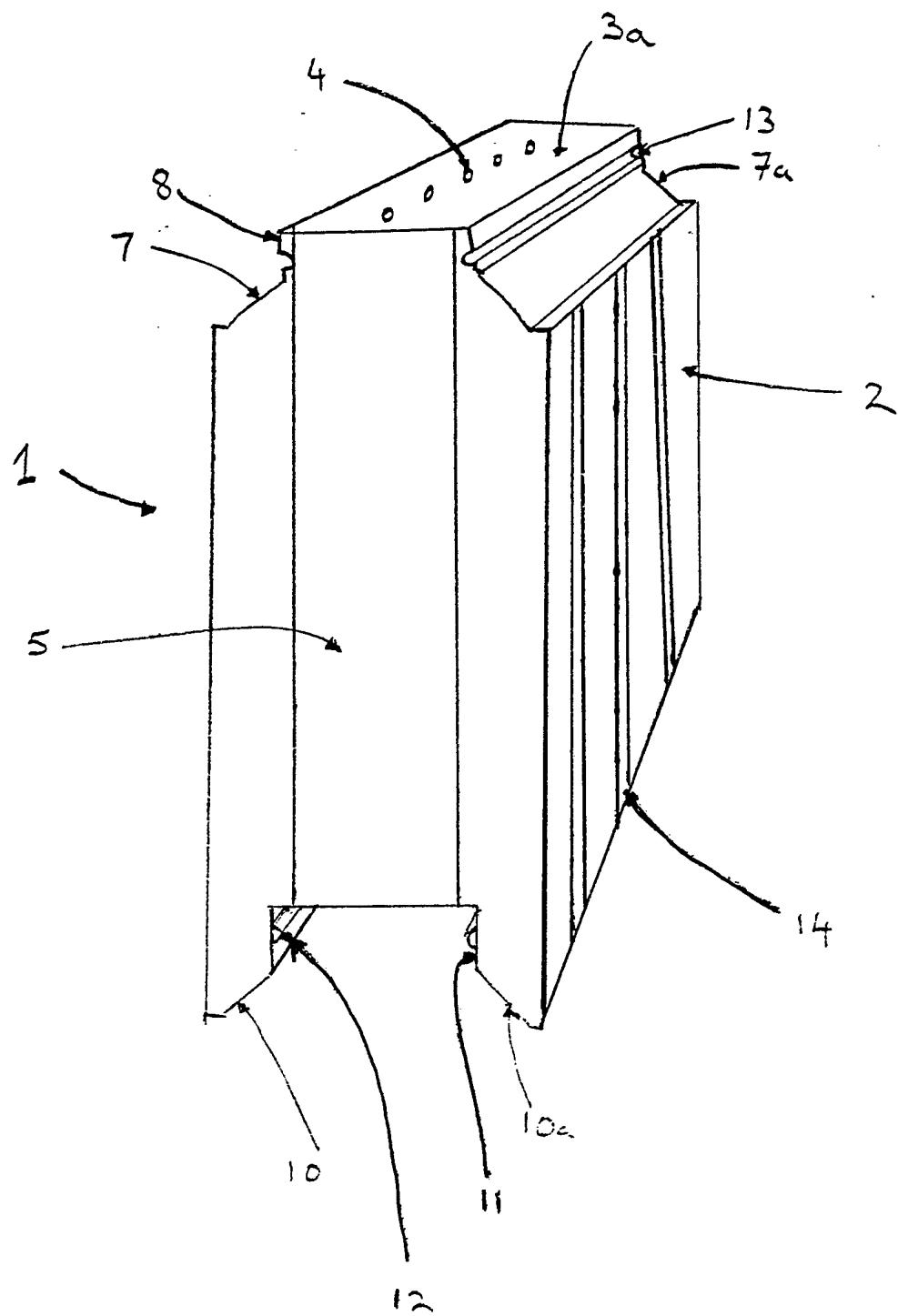


Fig 1

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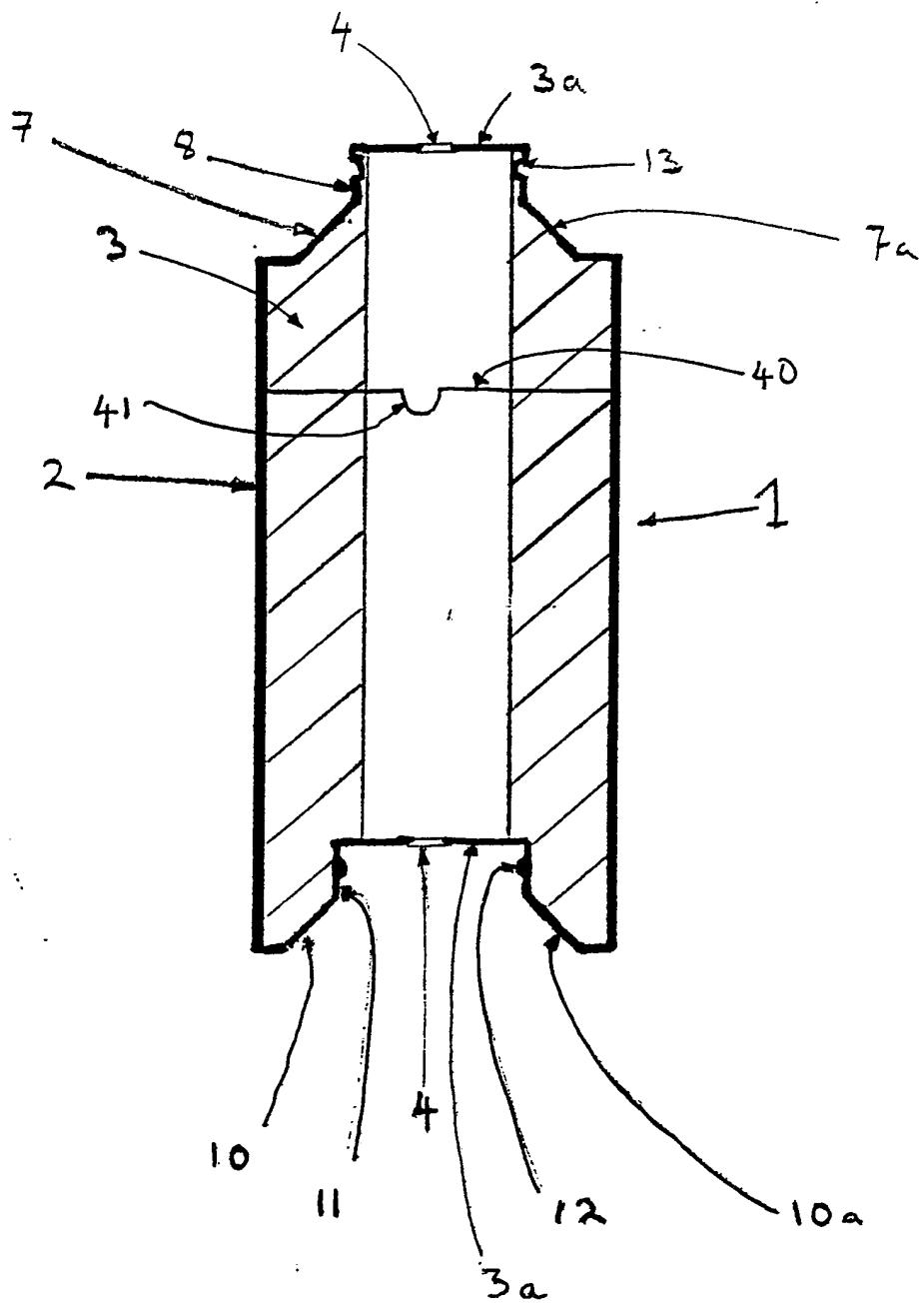
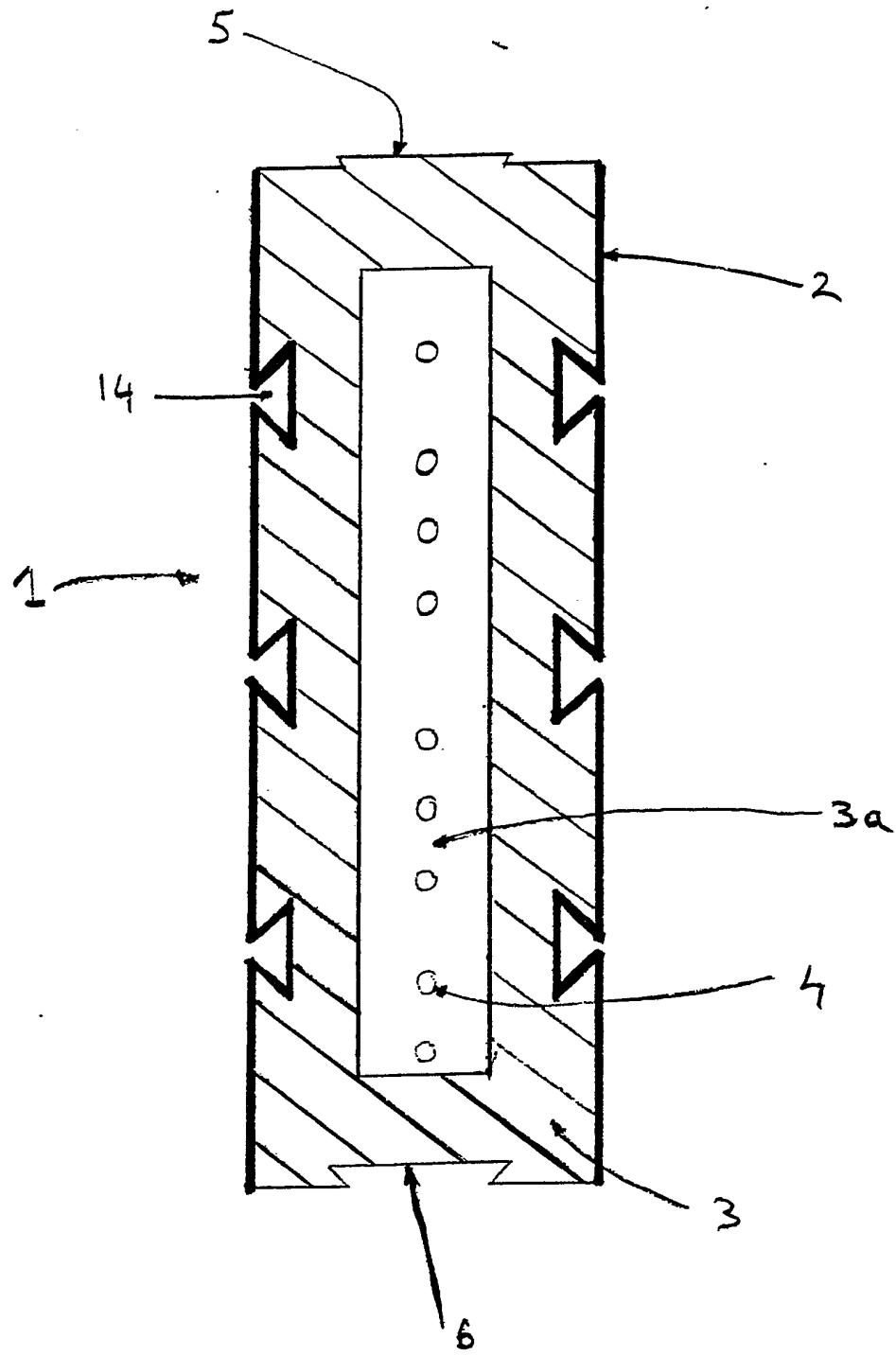


Fig 2

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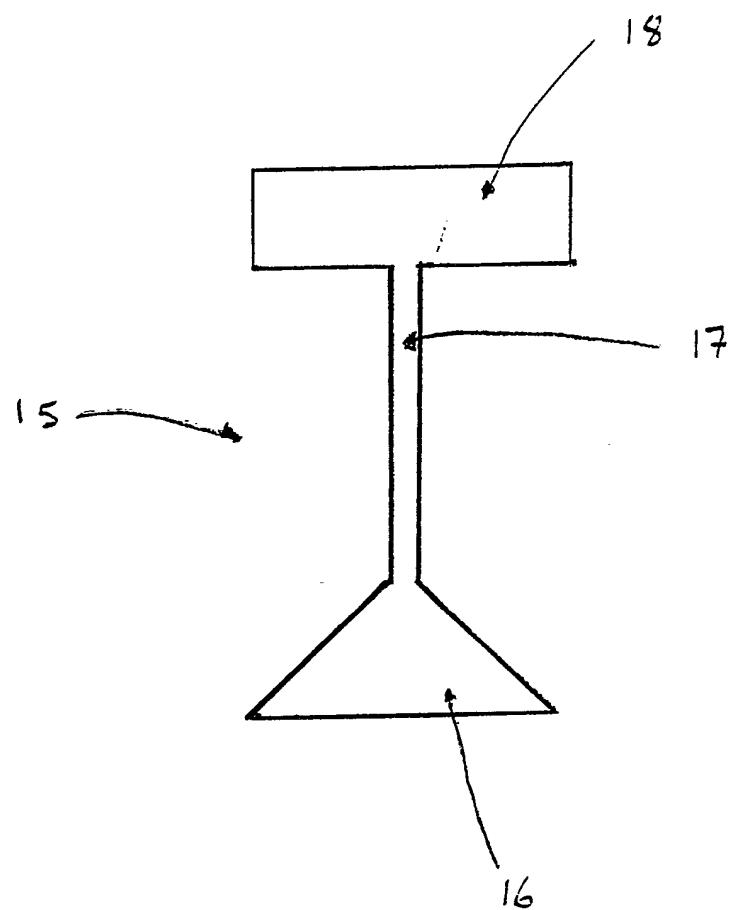


Fig 4

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Insulation of Walls

This invention relates to the insulation of walls especially but not exclusively of buildings notably houses.

In the UK at least many houses are produced with cavity walls. A cavity wall construction comprises an outer wall of, for example, brick. Spaced apart by an air gap of the order of 10cm there is provided an interior wall of, for example, brick or breeze block. The thermal conductivity of air is lower than that of many other materials and hence the thermal conductivity of the wall as a whole is less than would be the case if a single layer of brickwork of comparable thickness were employed.

Unfortunately such a construction is far from ideal. Convection currents tend to be set up in view of the thermal gradient between the inner and outer walls resulting in more rapid heat transfer than would otherwise be the case.

One solution to this problem is to trap the air within the cavity, for example, by foam. Superficially the procedure is attractive. The wall is made in the usual

way and a polyurethane foam introduced into the air gap. Air is trapped in the cells and is not so liable to be transported across the thermal gradient.

In practice it can be difficult to introduce the foam correctly and large unfilled areas can result. Even more importantly the foam can make it much easier for damp to penetrate right through the wall.

The invention seeks to provide a wall insulation less susceptible to at least some of these defects than hitherto.

In its simplest form the invention provides a tubular insulation block. During construction of a wall the insulation blocks are inserted into the wall cavity. The sides of the blocks are of insulating material and hence reduce the thermal conductivity of the wall. The tubular portion allows water to drain away without saturating the insulant and hence substantially reducing the chances of damp penetration. The drained water can safely be discharged in a suitable way.

According to the invention there is provided an insulation block for insulating the cavity of a cavity wall, the block comprising:

- i. a skin containing
- ii. insulating material defining
- iii. a hollow core, and
- iv. a drain allowing draining liquid from the core.

The skin can comprise a UPVC extrusion.

The insulating material may be a closed cell foam preferably PU foam.

The block may comprise self skinning foam.

The drain can comprise a plurality of holes in the skin.

A face of the block may be provided with a mortise for engagement with the tenon of an adjacent block.

The block may be provided with a tongue for insertion into a mortar course of a wall.

The tongue can comprise a tie-clip carried in a dovetail mortise of the block.

An embodiment of the invention will be described by reference to the accompanying figures of which:

Figure 1 is a perspective view of a block;

Figure 2 is a lateral cross-section of the block;

Figure 3 is a longitudinal cross-section of the block,  
and

Figure 4 is a plan view of a tie clip.

Block 1 conveniently comprises a tough insulating skin 2 preferably of plastics material especially (U)PVC and may, for example, be fabricated, extruded or injection moulded. Contained within the skin 2 is an insulating layer 3 typically of foamed plastics material especially closed cell PU foam. A central core or tubular portion is, preferably, not occupied by the insulating layer. Skin 2 is not mandatory. If a self-skimming foam is used then the skin 2 will be formed in situ. Preferably a relatively impervious skin is provided. If a separate skin is provided then the foam can be sprayed onto the inside of the skin and cured or fabricated.

The skin 2 need not extend over the whole surface of the block 1. Preferably the skin 2 is denser than the insulating layer. Preferably the skin is 0.5 to 5 mm

thick.

Preferred embodiments of the invention are provided with a baffle 3. It will be recalled that one of the problems with air-gap cavity walls is convection mediated air circulation. This can be overcome by providing each block 1 with one or more baffles which substantially limit the scope of convection without conduction through the baffle to compartments. The baffle 3a should be pervious to water. This can be achieved by using a permeable baffle 3a or by using one provided with holes 4. In the embodiment shown two baffles are provided but other numbers may be used.

In a preferred embodiment of the invention stays 40 are provided. The stays 40 extend between dovetails of opposing faces and serve to increase the articles strength.

The stays 40 are conveniently formed of plastics material and may for example, be moulded integrally with the skin. Alternatively they may be formed of other materials such as galvanized iron. The stays 40 are preferably rod-shaped but this is not essential and other shapes such as foraminous sheets may be employed. It is strongly preferred that an elbow 41 be formed in the stay

40. The function of the elbow 41 is to ensure that any droplets of condensation which form on the stay collect in a position such as to drain from the core.

In some embodiment of the invention the block of the invention will be formed integrally with the components, such as breeze blocks or cladding of one or both leaves of the wall.

Because the block is strong and readily stackable a 'wall' of blocks may be constructed and then the leaves built around the wall. This can be very convenient especially with pourable leaf constituents. For example, a 'wall' of blocks may be constructed, shuttering arranged around it and concrete poured in. When the concrete has set the shuttering can be removed to give a completed wall.

The invention also allows for utilities such as water and electricity to be readily routed through the cavity.

Typically each block 1 will be about 100-300 mm high preferably about 200 mm high more preferably 160-240 mm high but this can be varied to suit preferences or requirements.

The distance between the faces of the blocks

corresponds fairly closely to the size of the gap between the inside faces of each wall ("leaf").

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In simple embodiments the blocks 1 are simple rectangular prisms or cuboids. In preferred embodiments however more complex shapes are employed. The advantage of using these shapes is that the assembly has greater structural integrity. Furthermore ease of alignment may be improved.

For example, one end of each block can be provided with tenon 5 and the opposing end with mortise 6. In use the tenon of a block engages the mortise of an adjacent block thereby rendering the line of blocks more rigid. Preferably dovetail tenon and mortises are provided. This arrangement is very satisfactory for improving rigidity in a horizontal plane but can be inconvenient for use in a vertical plane. A preferred arrangement for us in a vertical plane is shown in the Figures. In this arrangement one face of the block is provided with tapering shoulders 7, 7a and a projecting nose piece 8. The opposing face is provided with a corresponding cavity 9 having chamfered edges 10, 10a and a central depression 11. In use the shoulders 7 and nose piece 8 of one block mate with the chamfer 10 and depression 11 of an adjacent block.

To still further improve rigidity detent means can be provided. In the embodiment shown the central depression 11 is provided with lip 12. Nose piece 8 is provided with hollow 13 which engages in use the lip 12 of an adjacent block. Alternatively pits and pips may be employed. The detent is strongly preferred since it not only improves the rigidity of the arrangement but also reduces the tendency of water to pass between the blocks. The detent effectively functions as a moisture baffle.

If desired the blocks may be keyed to either or both leaves. A number of ways of doing this will suggest themselves to those skilled in the art. Building blocks and bricks tend to be supplied in standard sizes. Accordingly the distance between lines of mortar will often be standarised. One solution is to provide the sides of the block with protruding tongues spaced apart by such a distance that in use each tongue is aligned with a mortar layer.

The tongues can be embedded in the mortar where they will be firmly held when the mortar has set.

Preferably however a side or the sides of the block is or are provided with a dovetail mortise 14 extending

along the block. Each side may be provided with more than one mortise. Preferably each side has three.

Optionally there are further provided tie clips 15. Tie-clips are conveniently made of non-corrodible material such as galvanised iron, UPVC or aluminium. Tie clip 15 has a head 16 in the form of a dovetail tenon capable of mating with dovetail mortise 14. The body 17 of the tie clip can be relatively narrow. Tail 18 of the tie-clip is enlarged.

In use parallel courses of wall are laid and block 1 inserted therebetween. Head 16 of tie clip 15 is engaged with dovetail mortise 14 of block 1. The tie-clip is run down the mortise until it is just above the top of a course. Mortar is laid on top of the course followed by a further layer of walling. Tail 18 of the clip 15 is thereby bonded to the wall course. Similarly if as described hereinafter concrete or the like settable material is cast around blocks the clips will aid the structural integrity of the whole.

When used in connection with penetratable materials a different method of employing the ties can be adopted. Tail 18 can be folded to lie generally parallel with the leaf and then secured to it by nails screws or the like

fasteners. Alternative constructions may be provided and will be apparent to those skilled in the art. The tail may be formed generally perpendicular to the head. Alternatively, or additionally holes may be formed in the tail for receiving the fasteners.

Although described by reference to a cavity wall the invention is not restricted to such use. It need not for example, necessarily insulate a wall, it may be sued in floors and ceilings. This arrangement is particularly convenient since it allows for ready routing of services. The invention when used in a wall may also be used in other wall constructions such as timber clad constructions.

CLAIMS

1. An insulation block for insulating a gap between two leaves of a wall, the block comprising:

- i. a skin containing
- ii. insulating material defining
- iii. a hollow core, and
- iv. a drain allowing draining liquid from the core.

2. A block as claimed in claim 1 having a stay between opposing faces.

3. A block as claimed in claim 1 or claim 2 wherein the skin comprises a UPVC extrusion.

4. A block as claimed in any one of the preceding claims wherein the insulating material is a closed cell foam, preferably PU foam.

5. A block as claimed in claim 1 or claim 2 comprising self-skinning foam.

6. A block as claimed in any one of the preceding claims wherein the drain comprises a plurality of holes in the skin.

7. A block as claimed in any one of the preceding  
claim wherein a face of the block is provided with a  
mortise for engagement with the tenon of an adjacent  
block.

8. A block as claimed in any one of the preceding  
claims wherein the block is provided with a tongue for  
securing to a leaf.

9. A block as claimed in claim 8 wherein the tongue  
comprises a tie-clip carried in a dovetail mortise of the  
block.

10. An insulation block substantially as described  
herein by reference to any one of the accompanying  
figures.

## Relevant Technical fields

(i) UK CI (Edition K ) E1D (DCH, DLEHV, DF113, DLEHW,  
DLEQV, DF124, DLEQWNT, DF193,  
DF142)  
(ii) Int CL (Edition 5 ) E04B

Search Examiner

D J LOVELL

## Databases (see over)

(i) UK Patent Office  
(ii)

Date of Search

24 JUNE 1992

## Documents considered relevant following a search in respect of claims

1-10

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X, Y	GB 2227505 A (EPSICON LTD)	1, 7
Y	EP 0069428 A2 (VANDER HEIJDEN)	1, 4, 7

Category	Identity of document and relevant passages 14	Relevant to claim(s)

#### Categories of documents

**X:** Document indicating lack of novelty or of inventive step.

**Y:** Document indicating lack of inventive step if combined with one or more other documents of the same category.

**A:** Document indicating technological background and/or state of the art.

**P:** Document published on or after the declared priority date but before the filing date of the present application.

**E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.

**&:** Member of the same patent family, corresponding document.

**Databases:** The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

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E04C001/40

**US-CL-CURRENT:** 52/404.1

**ABSTRACT:**

CHG DATE=19990617 STATUS=O> A block for insulating the cavity of a cavity wall comprises insulating material (3), e.g. a closed cell foamed plastics material within a skin (2) of a denser material, e.g. polyvinylchloride, the block having a hollow core with means for draining it, e.g. apertures (4) in an air baffle (3a). Stays (40) may be provided to strengthen the block. The blocks may be formed integrally with the components, e.g. breeze blocks, of one or both leaves of the wall. 